

Claims

1. A continuous process for preparing polyolefins having a bimodal or multimodal molar mass distribution in suspension in at least two reactors R1, R2.x, R3.y which are connected in series and in which different reaction conditions are set, wherein the offgases A1, A2.x, A3.y, A4 and A5 leaving all the reactors connected in series are collected, the collected offgases are then compressed in a compression stage 10, the compressed offgases are subsequently cooled and the cooled material is separated into a gaseous fraction and a liquid fraction and the separated fractions are then recirculated to the polymerization process at different points.
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2. The process as claimed in claim 1, wherein the collected offgases A1, A2.x, A3.y, A4 and A5 are compressed to a pressure in the range from 0.5 to 2.5 MPa, preferably in the range from 0.9 to 2.0 MPa.
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3. The process as claimed in claim 1 or 2, wherein the compressed offgases heat up to temperatures in the range from 30 to 250°C.
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4. The process as claimed in one or more of claims 1 to 3, wherein the compressed offgases are cooled to a preferred temperature in the range from 0 to 100°C, particularly preferably in the range from 20 to 50°C.
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5. The process as claimed in one or more of claims 1 to 4, wherein the cooled material separates at a pressure in the range from 0.5 to 2.5 MPa into a liquid phase L and a gaseous phase G1 which are collected in a pressure vessel R6 and are then taken off separately from there.
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6. The process as claimed in one or more of claims 1 to 5 which is carried out in the presence of a Ziegler

catalyst, with the respective molar mass of the polymer fraction prepared in the various reactors R1, R2.x, R3.y and R4 being set by means of addition of hydrogen to the reaction mixture.

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7. The process as claimed in one or more of claims 1 to 6, wherein the highest hydrogen concentration and the lowest comonomer concentration, based on the amount of monomer, is set in the first reactor R1 and the hydrogen concentration is gradually reduced and the comonomer concentration is gradually increased, in each case based on the amount of monomer used, in the downstream further reactors R2.x, R3.y and R4.

10 15 8. The process as claimed in one or more of claims 1 to 7, wherein ethylene or propylene is used as monomer and an alpha-olefin having from 4 to 10 carbon atoms is used as comonomer in an amount from 0 to 10% by weight, based on the total weight of the resulting polymer.

20 25 9. The process as claimed in one or more of claims 1 to 8, wherein a saturated hydrocarbon having from 4 to 12 carbon atoms or a mixture thereof is used as suspension medium.

30 35 10. The process as claimed in one or more of claims 1 to 9, wherein hydrogen and inert gas are removed from the overall polymerization process in a targeted manner at one point by the offgas stream A1 being branched off separately from the circuit of the other offgas streams A2.x, A.y, A4 and A5 of the first reaction stage in the reactor R1, with the offgas stream A1 comprising a particularly large proportion of hydrogen and inert gas and being particularly low in monomer and comonomer.